

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (currently amended) A substrate provided with a layer of aligned fine particles, comprising
~~wherein a~~ a first monomolecular organic coating film bonded to a surface of the fine
~~particle is formed on the~~ a surface of the fine particle, said first monomolecular organic coating
film comprising a first functional group and a second functional group at ends of the molecule,
wherein said first functional group is bonded to the fine particle,
~~and a second monomolecular organic coating film bonded to a surface of the substrate is~~
formed on the surface of the substrate, said second monomolecular organic coating film
comprising a third functional group and a fourth functional group that is different from the
second functional group at ends of the molecule, wherein said third functional group is bonded to
the substrate, wherein
a chemical bond is formed between the second functional group and the fourth functional
group, the organic coating film on the surface of the fine particle is bonded to the organic coating
film on the surface of the substrate, whereby the fine particles are immobilized and aligned on
the substrate,
~~each of the organic coating film bonded to a surface of the fine particle and the organic~~
~~coating film bonded to a surface of the substrate is a monomolecular film having a functional~~
~~group, and~~
~~the fine particles are aligned on the substrate by chemical bonding between the functional~~
~~group of the monomolecular film fixed to the fine particle and the functional group of the~~
~~monomolecular film fixed to the substrate.~~
2. (original) The substrate provided with a layer of aligned fine particles according to claim 1,
wherein an alignment of the fine particles is a single layer of an assembly film.

3. (original) The substrate provided with a layer of aligned fine particles according to claim 1, wherein the fine particles are aligned in form of accumulated layers, and the fine particles are bonded to each other and immobilized.
4. (original) The substrate provided with a layer of aligned fine particles according to claim 1, wherein an average diameter of the fine particles is in a range from 0.5 nm or more to 50 nm or less.
5. (original) The substrate provided with a layer of aligned fine particles according to claim 1, wherein at least one of the organic coating film on the surfaces of the fine particles and the organic coating film on the surface of the substrate is a self-assembling film.
6. (original) The substrate provided with a layer of aligned fine particles according to claim 1, wherein the fine particles are patterned and aligned on the surface of the substrate.
7. (original) The substrate provided with a layer of aligned fine particles according to claim 1, wherein the fine particles are aligned in a concave portion of a concave and convex pattern formed on the surface of the substrate.
8. (original) The substrate provided with a layer of aligned fine particles according to claim 7, wherein a width of the concave portion is not less than five times and not more than 30 times the average diameter of the fine particle.
9. (original) The substrate provided with a layer of aligned fine particles according to claim 1, wherein the organic coating film on the surface of the fine particle is bonded to the organic coating film on the surface of the substrate with at least one binding selected from the group consisting of covalent bonding, ion bonding, coordinate binding and intermolecular force binding.

10. (original) The substrate provided with a layer of aligned fine particles according to claim 1, wherein the fine particles are at least one selected from the group consisting of metal, metal oxide, semiconductor, an amphoteric element, amphoteric element oxide, and resin.

11. (original) The substrate provided with a layer of aligned fine particles according to claim 1, wherein the fine particles are fine magnetic particles.

12. (original) The substrate provided with a layer of aligned fine particles according to claim 1, wherein

the substrate is formed of at least one material selected from the group consisting of metal, metal oxide, semiconductor, an amphoteric element, amphoteric element oxide, and resin.

13-35. (canceled)

36. (currently amended) A magnetoresistive device, comprising

~~wherein a~~ a first monomolecular organic coating film is formed on a surface of a substrate, said first monomolecular organic coating film comprising a first functional group and a second functional group at ends of the molecule, wherein said first functional group is bonded to the organic coating film being bonded to the surface of the substrate,

~~and a second monomolecular organic coating film is formed on a surface of a fine particle, said second monomolecular organic coating film comprising a third functional group and a fourth functional group that is different from the second functional group at ends of the molecule, wherein said third functional group is bonded to the organic coating film being bonded to the surface of the fine particle, wherein~~

~~each of the organic coating film bonded to a surface of the substrate and the organic coating film bonded to a surface of the fine particle is a monomolecular film having a functional group,~~

the fine particles are immobilized and aligned on the substrate by chemical bonding between the second functional group and the fourth functional group of the monomolecular film fixed to the fine particle and the functional group of the monomolecular film fixed to the substrate, and

at least a pair of electrodes for passing a current through the fine magnetic particles are formed to change an electrical resistance between the electrodes by an external signal magnetic field.

37. (currently amended) A magnetoresistive head comprising a magnetoresistive device and a shield provided outside the magnetoresistive device, comprising

~~wherein a~~ first monomolecular organic coating film is formed on a surface of a substrate, said first monomolecular organic coating film comprising a first functional group and a second functional group at ends of the molecule, wherein said first functional group is bonded to the organic coating film being bonded to the surface of the substrate,

~~a~~ second monomolecular organic coating film is formed on a surface of a fine particle, said second monomolecular organic coating film comprising a third functional group and a fourth functional group that is different from the second functional group at ends of the molecule, wherein said third functional group is bonded to the organic coating film being bonded to the surface of the fine particle, wherein

~~each of the organic coating film bonded to a surface of the substrate and the organic coating film bonded to a surface of the fine particle is a monomolecular film having a functional group;~~

~~the fine particles are immobilized and aligned on the substrate by chemical bonding between the second functional group of the monomolecular film fixed to the fine particle and the fourth functional group of the monomolecular film fixed to the substrate,~~

at least a pair of electrodes for passing a current through the fine magnetic particles are formed to change an electrical resistance between the electrodes by an external signal magnetic field, and

the shield is provided for preventing a magnetic field other than the signal magnetic field from entering the magnetoresistive device.

38. (currently amended) A magnetoresistive head comprising a magnetoresistive device and a yoke provided outside the magnetoresistive device, comprising

~~wherein a~~ first monomolecular organic coating film is formed on a surface of a substrate, said first monomolecular organic coating film comprising a first functional group and a

second functional group at ends of the molecule, wherein said first functional group is bonded to the organic coating film being bonded to the surface of the substrate,

and a second monomolecular organic coating film is formed on a surface of a fine particle, said second monomolecular organic coating film comprising a third functional group and a fourth functional group that is different from the second functional group at ends of the molecule, wherein said third functional group is bonded to the organic coating film being bonded to the surface of the fine particle, wherein

each of the organic coating film bonded to a surface of the substrate and the organic coating film bonded to a surface of the fine particle is a monomolecular film having a functional group,

the fine particles are immobilized and aligned on the substrate by chemical bonding between the second functional group of the monomolecular film fixed to the fine particle and the fourth functional group of the monomolecular film fixed to the substrate,

at least a pair of electrodes for passing a current through the fine magnetic particles are formed to change an electrical resistance between the electrodes by an external signal magnetic field, and

the yoke is provided for guiding the signal magnetic field to the magnetoresistive device.

39. (currently amended) A semiconductor device comprising a barrier layer serving as a tunnel barrier layer provided on a semiconductor substrate,

wherein a first monomolecular organic coating film is formed on a surface of the barrier layer, said first monomolecular organic coating film comprising a first functional group and a second functional group at ends of the molecule, wherein said first functional group is bonded to the organic coating film being bonded to the barrier layer,

and a second monomolecular organic coating film is formed on surfaces of fine particles, said second monomolecular organic coating film comprising a third functional group and a fourth functional group that is different from the second functional group at ends of the molecule, wherein said third functional group is bonded to the organic coating film being bonded to the surfaces of the fine particles,

~~each of the organic coating film bonded to the surface of the barrier layer and the organic coating film bonded to the surfaces of the fine particles is a monomolecular film having a functional group, wherein~~

~~the fine particles are immobilized and aligned on the barrier layer by chemical bonding between the second functional group of the monomolecular film fixed to the surfaces of the fine particles and the fourth functional group of the monomolecular film fixed to the surface of the barrier layer, and~~

~~the semiconductor device comprising an electrically insulating layer provided on the barrier layer and the fine particle layer.~~

40. (currently amended) A semiconductor memory device having an insulating gate semiconductor (MIS) type transistor structure comprising a barrier layer serving as a tunnel barrier layer between a gate insulating film of the MIS type transistor structure and a semiconductor substrate, the barrier layer provided on the semiconductor substrate,

~~wherein a first monomolecular organic coating film bonded to a surface of the substrate is formed, said first monomolecular organic coating film comprising a first functional group and a second functional group at ends of the molecule, wherein said first functional group is bonded to the substrate,~~

~~a second monomolecular organic coating film is formed on surfaces of fine particles, said second monomolecular organic coating film comprising a third functional group and a fourth functional group that is different from the second functional group at ends of the molecule, wherein said third functional group is bonded to the organic coating film being bonded to the surfaces of the fine particles,~~

~~each of the organic coating film bonded to a surface of the substrate and the organic coating film bonded to the surfaces of the fine particles is a monomolecular film having a functional group, and~~

~~the fine particles are immobilized and aligned on the substrate by chemical bonding between the second functional group of the monomolecular film fixed to the fine particles and the fourth functional group of the monomolecular film fixed to the substrate.~~

41-55. (canceled)